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Canine Leptospirosis in Glasgow

By

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Leptospiral jaundice was recognized in dogs soon after the first bacteriological identification of the disease in humans. Krumbein and Frieling (1916) reported the occurrence of two cases of human Weil's disease aetiologically associated with a jaundiced dog, and Uhlenhuth and Fromme (1919) found typical leptospira in the liver and kidneys of a jaundiced wolf-hound. A guinea-pig inoculated with a suspension of this animal's liver died after 37 days and spirochaetes were detected in its kidneys. Some years earlier spirochaetes had been found in dogs affected by Stuttgart disease, a non-jaundiced canine disorder characterized by haemorrhagic gastro-enteritis, oral ulceration and nephritis. Lukes (1910) described spirochaetes in haemorrhagic areas of the intestines of such animals, but their significance was questioned by Ball and Roquet (1911), who found similar spirochaetes in healthy animals, particularly in the kidneys. This finding is now of especial interest on account of the recognized location of leptospira in the healthy canine "carrier," but these veterinary workers produced insufficient evidence to establish the importance of their discovery. However, in 1923, Lukes and Debrek described in Stuttgart disease organisms morphologically resembling leptospira, which were situated in the kidneys of affected dogs. They suggested the name of *Spirochaeta melanogenes canis* for this organism.

That *Sp. melanogenes canis* was a leptospira there can be little doubt, but its place in the modern scheme of leptospiral classification must remain unknown. At first Lukes said that it was highly virulent for guinea-pigs, which suggested *Leptospira icterohaemorrhagiae*, the organism causing Weil's disease, but in 1926 he admitted certain technical errors in his earlier work and implied that this virulence had not been established. According to Krivacek (1924), working in Lukes' laboratory, the spirochaetes were present usually in enormous masses in the excretory tubules of the kidneys. This author also pointed out the difference between his findings and those of canine Weil's disease where the organisms were scanty in the kidneys and were commonly situated interstitially. These observations were somewhat obscured in this country by the publication of a paper by Okell, Dalling and Pugh (1925) who demonstrated the occurrence of two clinical forms of leptospirosis in dogs; one a hyperacute haemorrhagic variety, and another showing an icteric picture with either an acute or an insidious origin. These authors also pointed out that cases suggesting identity with their second or icteric type might show only slight fever and transient gastro-intestinal symptoms. The leptospira they isolated proved to be in every case identical with rat strains. Klarenbeek, in Holland, however, was convinced that there were other clinical forms of canine leptospirosis and in 1927 he described an icteric variety, resembling the infection investigated by Okell and his colleagues, and another in which the symptoms were those of the well-recognized Stuttgart disease and were ascribable to an azotaemic nephritis. In the latter condition leptospira were present in a proportion of cases in the kidneys as indicated by Krivacek. A possible explanation of the difference in clinical symptomatology was suggested by Klarenbeek & Schüffner (1933) who isolated from dogs a type of leptospira serologically distinct from *L. icterohaemorrhagiae*. They called this organism *Leptospira canicola*. It was found only in dogs and was very feebly pathogenic for guinea-pigs.

Of the leptospiral infections they encountered in 1933, Dhont, and others (1934) found that all the jaundiced cases were caused by *L. icterohaemorrhagiae* and 90 per cent. of the uraemic cases by *L. canicola*. In a later paper, Klarenbeek (1938) announced his findings in canine leptospirosis for the preceding four years. Fifty-seven dogs (38 per cent.) were infected with *L. icterohaemorrhagiae* and 94 (62 per cent.) with *L. canicola*. Of the former the great majority were jaundiced, of the latter only three. Uraemia occurred in 20 per cent. of cases infected with the classical type of leptospira and in 40 per cent. of *canicola* infections. In consequence of this finding serological investigations were carried out on dogs in various parts of the world; Uhlenhuth and Zimmermann (1936) found 15 to 20 per cent. of dogs examined infected, two-thirds with *L. canicola*; Greene (1941) in California found 28·5 per cent. of 368 canine sera positive with *L. canicola*; Walch-Sorgdrager (1939) showed that 40 per cent. of the sera of 414 Dutch dogs, suspected of having leptospirosis, reacted more strongly with *L. canicola* and only 26 per cent. with *L. icterohaemorrhagiae*. Raven (1941) in Pennsylvania found 24·8 per cent. of the 105 dogs she examined gave higher titres with *L. canicola* and 8·5 per cent. with *L. icterohaemorrhagiae*. In certain areas, however, infections with the classical type have been predominant; Petersen and Jacobsen (1937) found 19 sera positive from 53 dogs in a Danish village, but only one of them showed a higher titre with *L. canicola*, and Babudieri and Castagnoli (1940) in an examination of 159 dogs in Rome found 54 sera positive with *L. icterohaemorrhagiae* and only two with *L. canicola*. Schlossberger (1937) questioned the validity of a distinct *canicola* type of leptospira, but Niemand (1940) in a review assembled considerable evidence in its favour.

The diverse symptomatology of canine leptospirosis was elucidated by Wirth (1935, 1937, 1939) who proved experimentally that the clinical course of such infection was determined largely by the age and general resistance of the dogs. Thus infection of puppies with material from Stuttgart disease may produce Stuttgart symptoms or acute jaundice, while infection of older dogs with such material is difficult to achieve. Infection of young animals with rat leptospira usually produces acute jaundice, but the same organisms may produce Stuttgart symptoms in older dogs. In many cases, however, the infection is comparatively symptomless but the frequent establishment of a carrier condition is associated with a degree of renal damage which may lead to chronic nephritis. Wirth (1939) classifies the clinical forms of canine leptospirosis under the following headings.

(*a*) Acute severe jaundice.
(*b*) Acute jaundice-free uraemia "*Stuttgart Hundeseuche*."
(*c*) Chronic uraemia.
(*d*) Polyuria.
(*e*) Symptomless leptospiruria, either progressing to cure or after a variable period developing into an acute, fatal, usually uraemic, illness.

From this classification it is evident that clinical symptomatology is of little value in determining the incidence of canine leptospirosis and a serological survey is the only reliable and practical means available.

Serological Findings in Glasgow Dogs

Methods.—Serological tests were carried out by Schüffner's method as described by Davidson and others (1934); living leptospiral cultures were mixed with small volumes of the test serum in a series of ascending dilutions and after a period of incubation drops of the respective mixtures were examined by dark ground methods for the presence of agglutination or lysis. Leptospira are agglutinated by the lower dilutions of a specific antiserum and lysed by the higher so that in each case the titre of the serum is represented by the highest dilution in which demonstrable lysis occurs. Four strains of leptospira were used: strain Wijnberg (*L. icterohaemorrhagiae* Type AB), strains Utrecht IV and Berlin 4129 (*L. canicola*) and strain Wien I received from Professor Schlossberger as a type intermediate between *L. icterohaemorrhagiae* and *L. canicola*.

GENERAL GROUP

Through the courtesy and interest of veterinary surgeons blood was obtained from 101 dogs. The majority of these dogs were house-dogs and came from Glasgow or its immediate neighbourhood. Consequently the greater number were males, and, since the dogs were usually being destroyed, most of them were rather old. Nevertheless, the animals comprised a clinically unselected group of many different breeds. Forty-nine dogs were serologically negative and 52 positive. A certain degree of cross agglutination was common between the strains and six positive sera could not be classified; in these there was either no difference between the respective titres or the titre with "L. Wien I" was greater than the titre with *L. canicola* strains and the titre with "L. Wijnberg" was less. In general the titre with the "Wien" strain paralleled that with the classical strain. Bessemans and others (1938) considered "L. Wien I" to be a type of *L. icterohaemorrhagiae* and the writer subsequently established that it was an *icterohaemorrhagiae* variant of the Type B first described by Borg Peterson (1938). In serological work it seems slightly more susceptible to lysis than the "Wijnberg" strain, and more apt to show para specific reactions. Forty sera, however, showed a distinctly higher titre to *L. canicola* and six to *L. icterohaemorrhagiae*.

Table I shows that the obvious differences in titre with the two organisms made the diagnosis of the infecting type of leptospira comparatively easy in these cases.

The age and sex of a number of the animals was ascertained. Table II shows their bearing on the serological findings.

Table I: Serological Findings in General Group

	Sera reacting with *L. icterohaemorrhagiae*	Sera reacting with *L. canicola*	Titre
L. icterohaemorrhagiae group	0	1	1:10
	4	0	1:100
	0	1	1:300
	1	0	1:1000
	1	0	1:3000
L. canicola group	17	0	1:10
	8	4	1:30
	0	14	1:100
	0	15	1:300
	0	3	1:1000
	0	4	1:3000

Table II: Relationship of Age and Sex to Serological Reactions

Age (years)	Positive *L. icterohaemorrhagiae*	Positive *L. canicola*	Negative
1	0	2 (25%)	6
1-5	0	4 (31%)	9
5-9	2	4 (22%)	12
over	2	24 (55%)	18
Sex			
Male	4	28 (47%)	28
Female	0	3 (27%)	11

Clinical Symptoms.—Clinical details were received in only a very few cases and I have not been able to correlate them with serological findings. It is interesting that ten out of the eleven cases in which nephritic symptoms were mentioned were serologically positive with *L. canicola*. The remaining one was negative with all strains.

Kennel Group

A number of samples of blood were received from two greyhound kennels where cases of acute enteritis were occurring. Table III shows the serological findings. Sera from two dogs from other kennels were received. Both animals had symptoms of canine Weil's disease and both died. One, a greyhound, had a serum titre of 1 : 30 with *L. icterohaemorrhagiae* on its fourth day of illness and leptospira were found in its tissues after death by Levaditi staining; the other animal had a serum titre of 1 : 300 with *L. icterohaemorrhagiae* but no further details or specimens were received. So far as can be ascertained none of the dogs had been vaccinated against leptospirosis.

Table III: Serological Findings in Kennel Group

Kennel	No. of sera	Positive *L. icterohaemorrhagiae*	Positive *L. canicola*	Negative
1	10	2	0	8
2	4	2	0	2
Total	14	4	0	10

DISCUSSION

The specificity of the serological tests for leptospiral antibodies has been demonstrated by numerous workers. In a large number of examinations of human sera I have never found antibodies at a titre of 1 : 10 in people who had not been exposed to known or highly probable leptospiral infection. Confusing artefacts, of course, are not uncommon at such titres but they can readily be eliminated by the experienced worker. In Tables I and II 1 : 30 is the lowest specific titre recorded and I consider this sufficient evidence of infection at some time or other with leptospira. The higher incidence in male dogs agrees with the findings of the Dutch workers and the greater percentage of reactions in the upper age group is probably associated with the higher survival rate of the older animal exposed to leptospiral disease.

The difference in infection between the two groups of dogs is very striking, in the general group of house dogs about 40 per cent. had been infected with *L. canicola* and only 6 per cent. with *L. icterohaemorrhagiae*; in the kennel dogs over 28 per cent. had been infected with *L. icterohaemorrhagiae* and none with *L. canicola*. It is probable that rats are much more numerous near large kennels than in domestic surroundings so the kennel dog is likely to be more exposed to the rat leptospira. Further, the kennel dog is more restricted in its canine acquaintances than the house dog which has consequently more opportunity to acquire the canine leptospira. The number of kennel dogs examined is too few and the distribution too restricted to warrant the suggestion that this finding may be general but it is to be noted that the only greyhound examined in the general series also showed serological evidence of infection with *L. icterohaemorrhagiae*.

The significance of such serological findings in canine disease is also conjectural. Antibodies to *L. icterohaemorrhagiae* persist in the human for many years after initial infection, even up to 28 years (Stuart, 1939) and have no relationship to persistence of infection nor to residual tissue damage. Klarenbeek, however, found that leptospiruria occurred for a variable period in over 50 per cent. of dogs infected with *L. canicola* and Wirth pointed out that the coincident kidney damage might progress even after the elimination of the leptospira. It seems highly probable, therefore, that a considerable percentage of the common chronic kidney disorders of older dogs originates in *L. canicola* infection. Stuttgart disease, on the Continent at least, appears to be a name given to the clinical syndrome found in certain cases of chronic nephritis, almost invariably associated with uraemia. In this country there is perhaps a tendency to confuse it with "black tongue" which may be solely a vitamin deficiency disease. If one accepts the nephritic aetiology of Stuttgart disease then there is every reason to suppose that a very considerable percentage is due initially to infection with *L. canicola* which is much more likely than *L. icterohaemorrhagiae* to cause severe kidney damage without death. In the acute form diagnosis can be established readily by repeated serological tests to demonstrate a rising titre to *L. canicola*; in the acute and subacute forms, also, a leptospiruria may be demonstrable by dark-ground examination, but in the slowly developing chronic form leptospira are probably no longer present in the animal's body and their aetiological importance can only be presumed from persisting leptospiral antibodies in its blood serum.

Summary

Forty per cent. of 100 Glasgow house dogs have been infected with *L. canicola*. In greyhound kennels infection with *L. icterohaemorrhagiae* is not uncommon, but *L. canicola* infections have not been detected.

Acknowledgments.—I wish to express my appreciation of the friendly co-operation of a number of Glasgow veterinary surgeons and especially to thank Mr. W. L. Weipers. The greater part of this work was completed when I was Bacteriologist to the Glasgow Royal Infirmary and I wish to acknowledge my use of its laboratory facilities. In addition, I must thank the trustees of the Rankin Research Fund, the University of Glasgow, for an expenses grant.

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Whether a cow whose teats had been sealed with collodion had been caused unnecessary suffering was a point at issue before Shrewsbury magistrates, who dismissed a summons against Mr. T. B. Cambridge, High Hall, Blymhill, near Shifnal.

* * * * *

All the royal carriage horses are in future to be housed at Windsor instead of at Hampton Court, as was the custom before the war. The royal mews at Windsor Castle, which was converted into a Guards' barracks during the war, has now been handed back to the King.

Preliminary Observations on the Use of Phenanthridinium 1553 Against Trypanosomiasis in the Gold Coast

By

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The Gold Coast, which is heavily infested by tsetse fly, has small indigenous breeds of livestock which are of poor type but have a certain tolerance to trypanosomiasis. Clinical trypanosomiasis is common, especially when animals are subjected to heavy work, adverse conditions or any phenomenon which might disturb the normal balance. At veterinary headquarters at Pong-Tamale, a herd of 250 bullocks is maintained for the production of anti-rinderpest serum, the animals are bled weekly and frequently break down to trypanosomiasis. Most animals, particularly cattle, are infected early in life and an uneasy equilibrium eventuates after recovery and may be broken down at any time. The most satisfactory drug prior to phenanthridinium has been tartar emetic, but from observations covering many years it has been found that relapses are very frequent and it would appear that the action of tartar emetic when successful is to remove the parasites from the peripheral circulation, cause clinical symptoms to disappear with apparent recovery; the parasites remain quiescent and relapses occur frequently, particularly when exposed to such adverse phenomena as regular bleeding at the laboratory. Hence breakdowns are very common in serum bullocks.

Initial experiments with phenanthridinium 897 were unsatisfactory. Phenanthridinium 1553 was used first in June, 1945, with the dosage 2 mg. per kilo body weight. A single dose only has been given to each case intravenously, which represents no difficulty in this colony owing to the number of highly trained African staff. The following cases have been treated and no relapse has yet occurred. This is most hopeful, as with tartar emetic numerous relapses are usual.

Cases treated total 74 from June 30th to December 21st, 1945.

	T. vivax	*T. congolense*	*T. theileri*	Undiagnosed
Cattle	21	31	5	13
Sheep	1	—	—	1
Horses	2	—	—	—

Phenanthridinium appears to have an excellent tonic effect as well as a high trypanocidal index. Animals in poor condition picked up quickly. Smears have been taken at least once weekly from all cases treated and no parasites have been found; one case of *T. vivax* later showed *T. theileri* in the blood and was treated again by phenanthridinium. In the Gold Coast *T. theileri* infection is not uncommon and is definitely pathogenic. Thus preliminary experiments are most hopeful. Three cases of *T. vivax* treated in July by tartar emetic showed one relapse in early September which was then treated with phenanthridinium and is still negative. Recently 1 mg. dosage has been tried, that dosage being given to every alternate case in the last month and is continuing. Four bulls and eight cows had previously been treated with tartar emetic for trypanosomiasis; of these, one bull with *T. vivax* had been treated twice between January, 1945, and June, relapsing each time and showing parasites in the blood and animal in excellent condition, whereas prior to that, condition was poor.

One young bull—$\frac{1}{8}$th Hereford—had *T. vivax* infection in April, 1944, relapsed in December, 1944, treated again with tartar emetic and given phenanthridinium after relapse in July, 1945, has not shown parasites and has regained condition and health. One young Sanga (half Zebu) bull had the same history as grade Hereford bull.

Eight N'Dama cows. The N'Dama is an unhumped indigenous West African cattle beast of good conformation and possessing considerable resistance to trypanosomiasis. These cows were infected in October, 1944. They were not treated as an experiment until January, 1945, when they had lost condition though not badly. Given tartar emetic, they showed little improvement in condition and each showed parasites in the blood between the end of tartar emetic treatment at the beginning of February and treatment with phenanthridinium on July 6th, 1945, since when no parasites have been found and the cows have regained excellent condition and weight.

A N'Dama bull was sent in from the village to which he had been issued. Showed *T. vivax* in blood and clinical symptoms and it is almost certain he had been sick for some time, though the villagers stated that he had not. He was treated with tartar emetic in January, 1945, relapsed in March, re-treated, relapsed in June and was treated by phenanthridinium in early July, since when no parasites have been found and the bull has regained condition and health. He was castrated in August for reasons not connected with trypanosomiasis.

No toxic symptoms have appeared at any time.

Sale Rules Relating To Contagious Abortion

For many years some breed societies have insisted that all the entries at their special sales had recently passed the agglutination test. This allowed the entry of clean unvaccinated animals and those which had been vaccinated with strain 45/20 (No. 2 vaccine), but not those recently vaccinated with strain 19 (No. 1 vaccine). Since No. 1 vaccine prepared from strain 19 has come into general use for both calfhood and adult vaccination, certain breed societies have felt that new rules should be made to permit the acceptance of vaccinated stock, provided it was reasonably certain that their agglutination reaction was due to vaccination.

The National Cattle Breeders' Association took the matter up and sought the advice of veterinary experts. Eventually they met representatives of the N.V.M.A. and an agreed set of model rules was drafted. These have now been approved by the Executive Committee of the N.C.B.A. and have been circulated to the secretaries of breed societies with the suggestion that they should be adopted for special society sales. It is not yet known how many breed societies will adopt these rules but the Red Poll Cattle Society has accepted them. It seems advisable that the rules and a short commentary on them be published in *The Veterinary Record* for the information of the profession.

In reading the rules, which are appended hereto, it should be borne in mind that the objective was to draw up regulations which would give as full protection as possible to the purchaser at these sales. They are primarily intended to prevent the entry of an animal which is infected.

No. 1 of the rules does not alter the existing position except, perhaps, to make it clear that the vaccinated animal which has ceased to react (*e.g.*, vaccinated as a calf and sold as an in-calf or in-milk heifer or cow) will be accepted. Rule No. 2 is, at first sight, a little difficult to understand. The first objective (*a*) is to make certain that the animal is negative to the agglutination test prior to vaccination. This is to prevent a reaction produced by natural infection being ascribed to the vaccination. In (*b*) the need for identification and date of vaccination is obvious. The third part of the certificate (*c*) is to ensure that there is good evidence that the vaccinated animal has reacted. There have been instances in which there has been no rise of titre following vaccination and since this might be due to the vaccine being dead or to some other accident it is thought essential that the titre be obtained between 25 and 35 days after vaccination to "prove" vaccination and to establish the level of the vaccination reaction in the animal since this varies from one individual to the other. The titre in the vaccinated animal should gradually fall after vaccination and so the result of an agglutination test prior to sale (*d*) is insisted upon as evidence that there has been no superimposed infection. The Rule 3 applies the same principles to revaccination.

The recommendations to cover the interim period have been designed in the knowledge that already many animals have been vaccinated without their having been proved negative to the agglutination test. The owner of such an animal vaccinated as a calf (*a*) may wish to expose it for sale before the vaccinal reaction has completely worn off. It will be accepted if the titre does not exceed 1:40 when the test was made within six weeks of the sale, in the belief that such an animal could not have been infected before vaccination or have become infected since. When the animal was over eight months of age when vaccinated (*b*) this reaction level is permitted, but two tests have been thought necessary to have convincing proof that the reaction is *not* the result of infection.

Suggested forms of certificate are appended but what must be emphasized at the moment is that where there exists any possibility of the owner requiring a certificate for a pedigree animal at some future date, the veterinary surgeon must advise that the animal be identified beyond doubt, "blood tested" before vaccination and between the 25th and 35th day thereafter. Then, and then only, the way is clear to comply with these rules at some future time.

At present there is no good indication how general these rules will become. Some societies may turn them down as impracticable. They certainly mean additional labour and expense but the practitioner to a pedigree breeder would be well advised to warn him of their existence in draft form before vaccinating in his herd, so that the owner may, if he wishes, take action then; action which will prevent the possibility of his stock being excluded from a Society Sale.

It may be worth while to add a short note on the agglutination test. Some short time after an animal has become infected with

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Br. abortus or has been vaccinated with a smooth strain living abortus vaccine [*e.g.*, No. 1 vaccine (Strain 19)], agglutinins appear in the blood. The serum will then cause clumping of the bacteria in a suspension of *Br. abortus* even when it is present in small proportion. Generally, undiluted serum is not used in these tests because such serum commonly agglutinates *Br. abortus* even when obtained from a non-infected and non-vaccinated animal. Serum dilutions of 1:10, 1:20, 1:40, 1:80, etc., are commonly used. The highest dilution in which agglutination takes place is called the titre. Thus a serum which shows reaction at 1:10 only has a titre of 1:10 and one which reacts in each tube up to the 1:80 dilution has a titre of 1:80. Reaction at 1:10 only, or at 1:10 and 1:20 only, is occasionally met among non-infected and non-vaccinated cattle. These levels of reaction (titre 1:10 or titre 1:20) are, therefore, interpreted as doubtful results. In these circumstances it is recommended that the test be repeated after an interval of not less than two and not more than four weeks. If the same titre, or a lower one, is recorded at the second test the sound assumption is that the animal is not infected and the result can be declared negative. A titre in excess of 1:20 is a positive reaction and means nothing more than that the animal is, or has been, infected with *Br. abortus* or has been vaccinated. Obviously, the higher the titre, within reason, the more certainly positive the result.

The animal negative to the agglutination test shows a change to high titre reaction within about three weeks after vaccination with No. 1 vaccine. This level will fall during the ensuing year and, in the case of calfhood vaccination, it has generally reached such a low level when the heifer is in calf that a negative result is returned. In the interim rules it has been assumed, on good grounds, that a titre of 1:40 (confirmed by a second test when the animal has been inoculated when over eight months) indicates that although the result is positive it can properly be accepted as the result of vaccination.

The following is a copy of the suggested sale rules which the National Cattle Breeders' Association has sent to all the Cattle Breed Societies, with a recommendation for their adoption, together with suggested recommendations to cover the interim period to January 1st, 1948.

RECOMMENDATIONS FOR THE CERTIFICATION OF CATTLE SOLD SUBJECT TO AGGLUTINATION TEST SUBSEQUENT TO VACCINATION WITH S.19

Suggested Rules

1. An entry accompanied by a certificate that the animal has passed the agglutination test within six weeks of the date of sale may be accepted whether or not the animal has been vaccinated. If the vendor wishes to enter such an animal as vaccinated, the entry must be accompanied by a certificate of vaccination.

2. An entry which is not accompanied by a certificate that the animal has passed the agglutination test within six weeks of the date of sale will only be accepted provided it is accompanied by a certificate, certifying:—

(*a*) That the animal *passed* the agglutination test within two weeks *prior* to vaccination.

(*b*) The date of vaccination.

(*c*) The level of the reaction titre of an agglutination test taken 25 to 35 days after vaccination.

(*d*) The level of the reaction titre of an agglutination test made within six weeks of the date of sale. This level must not exceed that of (*c*) above.

3. Revaccinated animals will be accepted provided their certificate shows that they were negative to the agglutination test prior to vaccination for the first time, and that the level of the reaction titre of an agglutination test made within six weeks of the date of sale does not exceed that of the agglutination test made 25 to 35 days after revaccination.

Suggested Recommendations to Cover Interim Period to January 1st, 1948

To enable animals vaccinated prior to the date of adoption of these recommendations by the Breed Societies to be eligible for Breed Society Sales, the following rules will apply for the interim period until January 1st, 1948, after which date rules 1 to 3 above will apply to all animals.

(*a*) An animal vaccinated, prior to the date of adoption of these recommendations by Breed Societies, between four and eight months of age, will be accepted provided it is accompanied by a certificate, certifying:—

(i) The date of vaccination.

(ii) The level of the reaction titre of an agglutination test carried out within six weeks of the date of sale. The reaction titre must not exceed 1:40.

(*b*) An animal vaccinated, prior to the date of adoption of these recommendations by Breed Societies, at an age exceeding eight months, will be accepted provided it is accompanied by a certificate, certifying:—

(i) The date of vaccination.

(ii) The level of the reaction titre of two agglutination tests carried out at an interval of not more than two months and not less than one month—the second being within six weeks of the date of sale. The second reaction titre must not exceed the first and neither must exceed 1:40.

(*c*) Where a pre-vaccinal certificate of having passed the agglutination test is available, it should also be produced.

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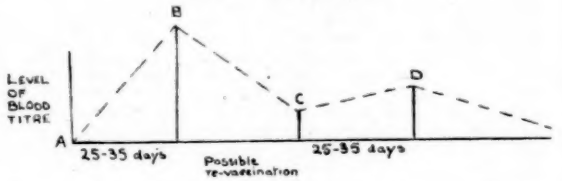
APPENDIX "A"

EXPLANATORY DIAGRAM



A—Dates of agglutination test and vaccination. This prevents inoculation being used to mask natural infection.

B—Second agglutination test (1) to prove that the animal has reacted to the vaccination; (2) to establish the maximum level of the blood titre resulting from vaccination.

C—Point of a "boost," second, or subsequent vaccination.

D—Same as B.

These recommendations are based on the fact that the antigen and technique employed in the agglutination test have been standardized.

A standard antigen and a standard technique for agglutination test have been agreed by representatives of laboratories which are known to perform at least 90 per cent. of the tests in Great Britain.

These recommendations require the level of the reaction titre of all agglutination tests to be incorporated in the certificate provided by the laboratory carrying out the test.

APPENDIX "B"

SUGGESTED CERTIFICATE

To be completed by the veterinary surgeons, retained by the owners and transferred to purchasers along with the animals.

Name and address of owner.....

Name and identification marks of animal.....

Agglutination reaction titre prior to vaccination ...	Date.....	Signature of veterinary surgeon.....
Vaccination	Date.....	Signature.....
Agglutination reaction titre 25-35 days after vaccination	Date.....	Signature.....
Agglutination reaction titre before sale	Date.....	Signature.....
Agglutination reaction titre prior to revaccination ...	Date.....	Signature.....
Revaccination	Date.....	Signature.....
Agglutination reaction titre 25-35 days after revaccination	Date.....	Signature.....
Agglutination reaction titre before sale	Date.....	Signature.....

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APPENDIX "C"

SUGGESTED CERTIFICATE

To apply to animals vaccinated, prior to date of adoption of these recommendations by Breed Societies, at from four to eight months of age.

Name and address of owner.....

Name, identification marks and date of birth of animal.....

Vaccination	Date.....	Signature of veterinary surgeon.....
Agglutination reaction titre before sale	Date.....	Signature.....

APPENDIX "D"

SUGGESTED CERTIFICATE

To apply to animals vaccinated, prior to date of adoption of the recommendations by Breed Societies, at an age exceeding eight months.

Name and address of owner.....
Name, identification marks and date of birth of animal.....
Vaccination ... ... Date..... Signature of veterinary surgeon.....

Agglutination reaction titre
before sale: 1st test ... Date..... Signature.....
2nd test ... Date..... Signature.....

THE AGGLUTINATION TEST. Blood serum from an animal infected with *Br. abortus* contains substances called agglutinins which cause clumping (agglutination) of the organisms when brought into contact with them in a suspension. If undiluted serum is used it may cause clumping, even if the animal from which it was taken is not infected. This is referred to as a non-specific reaction. In order that the result may be specific, serum is used in several dilutions, *e.g.*, 1:20, 1:40, 1:80. A reaction with a dilution (titre) of 1:20 may not necessarily mean that the animal is infected and the reaction is classed as doubtful, but if clumping occurs at higher dilutions (titres) the animal must be considered to be infected. The higher the titre at which clumping takes place, the more definitely positive is the reaction.

THE MILK INDUSTRY: BIG DEVELOPMENTS PENDING

"Big developments are pending in the milk industry," states *The Farmer and Stock-Breeder* in its issue of March 9th, and continues: "In our last issue our Political Correspondent stated that a Cabinet decision was likely soon on the question of pasteurization, and that it was probable that there would be a clear-cut decision—pasteurization for *all* milk which is not from a T.T. herd. The Minister of Health (Mr. Aneurin Bevan) has been pushing very hard on this subject.

"The Milk Board is evidently on the verge of launching a big scheme of its own. Last week we quoted the Vice-Chairman, Mr. Ben Hinds, as saying that the Board had set itself the aim of getting all milk sold in Britain to be T.T. and every milk cow an attested animal. This week the Chairman, Sir Thomas Baxter, says the Board is anxious to enlist the full co-operation of the Government in a long-term scheme to ensure these standards being reached within 20 years.

"These decisions would mean big issues to be faced. Compulsory pasteurization will meap a big expenditure on plant (when that is available) to comply with the regulations.

"The drive towards T.T. standard raises the question of whether a slaughter policy should be adopted and, if so, who is to bear the cost? Obviously the present emergency demands that there should be no major interference with the milk supply, so that a practical course would be to develop on the basis of establishing clean areas, the foundations of which already exist in Wales and Ayrshire. Reactors could be exported to other areas until the scheme had extended to the point where it would be practicable to commence slaughter. Here another point arises: Should reactors be marked?

"The Ministry should also consider the advisability of merging the present T.T. and attested standards, aiming at, say, T.T. milk from attested cattle. At the moment the producer and the consumer can only be confused. Which is the higher standard? So far as bonus is concerned, the T.T. producer wins.

"Much progress will have to be made with buildings and water supplies. How is this costly work of improvement to be financed? The Milk Board will, no doubt, claim that it should be done through the producer's own organization. T.T. milk earns a bonus of 4d. Will this continue, or will the time come when only T.T. milk will be paid the standard price? During the year ended September 30th, sales of milk off farms amounted to 1,205 million gallons of which 124 million were T.T. The bonus costs the Ministry of Food £2,000,000 per year."

* * * * *

WEEKLY WISDOM

There is good authority for the wisdom of cultivating a garden, whether it is literal or metaphorical, and "escapist" is a dreary, question-begging epithet to hurl at a man determined to do it.—The Times.

biotics in that its action is little affected by body secretions or fluids, and that it has a fairly wide range of action. These properties will prove of importance to the clinician when the drug becomes generally available in the late summer or autumn.

THE VETERINARY RECORD

March 23rd, 1946

PENICILLIN THERAPY

THE veterinary profession has been anxiously awaiting the results of the experiments with penicillin that were known to be in progress under the auspices of the Agricultural Research Council. We are glad to be able to print to-day a very short summary of the results in the treatment of mastitis so far obtained. Although it may be too early to dogmatize, it would seem that penicillin is of considerable value in the treatment of this disease, if the quarters of the affected udder are each infused with 20,000 Oxford Units of the sodium salt in 50 c.c. sterile water on two consecutive days. With this technique, the cures seem to be of the order of 80 per cent.

Certain conditions are desirable if penicillin therapy is not to suffer from misuse or from exaggerated claims as to its efficacy. As a proportion of cases of mastitis do not respond to penicillin treatment, clinical diagnosis should be checked by bacteriological methods. This is important particularly because experiments so far reported relate only to *Streptococcus agalactiae* infections, although experiments on other types of mastitis are known to be proceeding. Penicillin does not lessen the need for accurate diagnosis, but rather strengthens the demand for it. It is highly important that the treatment of mastitis by udder infusion with penicillin solutions should be regarded as a surgical operation, to be carried out with the utmost care and aseptic precautions. These precautions must be taken during the injection of penicillin solutions into the udder to avoid transferring bacteria from one animal to another, and to ensure that extraneous organisms are not introduced by unskilled technique. Penicillin has no effect upon tubercle bacilli or upon most of the Gram negative organisms. Indeed, several of these latter bacteria produce a substance capable of decomposing it.

Penicillin has been obtained in the form of a strong free acid and also as salts of barium, potassium, sodium, ammonium, calcium, silver and strontium. The most commonly used is that of sodium which is highly hygroscopic and readily soluble in water. In the dry state all the salts are slightly susceptible to light. As many common bacteria, such as *Bact. coli*, can produce a substance capable of destroying penicillin, it is advisable that even the solid forms of the drug should be packed in sterile bottles and stored in the refrigerator. Penicillin, in the dry state and in solution, is adversely affected by heat in direct relation to the temperature. The dry sodium salt stored at 0° C. showed 50 per cent. loss of activity after six months; in solution the corresponding loss was 85 per cent. At temperatures below 10° C. solutions of penicillin can be kept for several days without significant loss of potency. Solutions of penicillin are most stable just on the acid side of neutrality. The drug is destroyed by oxidizing agents, such as permanganate and hydrogen peroxide. A point of importance in its therapeutic use is that it is also unstable towards various heavy metals, particularly copper, lead, zinc and cadmium, and to rubber, and therefore the solution should not be allowed to remain in contact with these substances except for the shortest possible time. Rubber tubing should be washed after penicillin has passed through it.

Penicillin has the advantage over many other anti-

ABSTRACTS

[**Erysipeloid of Rosenbach: Response to Penicillin.** Barber, Mary and Nellen, M. (1946.) *Lancet.* **250**. 125-127.]

Seven cases diagnosed clinically as erysipeloid of Rosenbach (human infection with *Erysipelothrix rhusiopathiae*) were admitted within a period of four months to the British Postgraduate Medical School. The five cases from which the organism was isolated occurred in a butcher, two butcher's assistants, a cook and a housewife. The incubation period following injury varied from one to six days. The typical clinical picture is one of pain at the site of injury, a sharply defined elevated zone of purplish-red erythema, lymphangitis, and fever up to 100 to 102° F. The authors point out that although serum has been recommended in treatment, serum-sickness is often more incapacitating than the disease.

The strains isolated were sensitive to penicillin *in vitro* and three of the five cases confirmed bacteriologically responded within 48 hours to intramuscular injections of penicillin.

Six of the seven cases were associated with wounds sustained while handling beef or rabbit bones but there was no connection between the individual cases. The condition is probably more common than is generally realized and bacteriological diagnosis is difficult: direct plating of biopsy material failed in each case to yield the organism and it was only after incubation of a biopsy specimen of skin for 24 hours in glucose broth that cultures were obtained, and then in only five of the seven cases.

E. G. W.

* * * * *

[**A New Remedy for Fleece Worms.** Rude, C. S., Smith, C. L., and Parish, H. E. (1945.) *U.S. Dept. Agric., Agricultural Research Administration, Bureau of Entomology and Plant Quarantine.* 2 pp. (February.)]

Research by the U.S. Bureau of Entomology and Plant Quarantine has developed a new remedy against sheep maggots, particularly *Phormia regina* and *Cochliomyia macellaria*. The remedy, which can be applied without shearing the infested area, penetrates the wool, kills all larvae it reaches and also coats the wool and skin to give satisfactory protection against subsequent reinfestation. The mixture, known as Formula M.S. 793F, is prepared by first dissolving diphenyl (a protective agent) ten parts in benzine (used as a killer) 84 parts by shaking the two substances together in a closed container and not near an open flame since benzine is highly inflammable. Triton 770 (sodium salt of an alkylphenoxypolyether sulphate, used as a wetting agent) one part and n-butyl alcohol (as a combining agent) five parts are next mixed together and then added to the benzine-diphenyl mixture, the whole being thoroughly agitated by shaking. All proportions are by weight. The freshly made mixture has a cloudy appearance which disappears on standing to give a clear and almost colourless finished product. To treat a sheep, determine the extent of the infested area and then pour enough mixture on it to wet the wool in the area and for about two inches beyond it, starting first at the perimeter to prevent maggots from crawling into the uninfested wool. Rubbing or otherwise working the mixture in is unnecessary as it readily penetrates the wool. About a pint of the liquid, which should be kept in a container capable of being tightly closed when not in use, is needed to treat an average case of maggot infestation. The mixture has been tested on several hundred sheep without ill-effects, and wounds treated with it heal quickly.

J. N. O.

X-RAY PICTURES IN DIAGNOSIS

In a note on our review of "Radiology in Canine Medicine," by George B. Schnelle, the *J.A.V.M.A.* observes that "The British reviewer seizes the occasion to point out that prints of X-ray pictures are over-touted as guides to diagnosis, emphasizing that, except in the case of gross changes or foreign bodies, only the original film amounts to much as a guide in diagnosis," and comments: "Who will disagree with that self-evident truth? Certainly not the editor who has to confess that he has pawed, selected, scanned, and paid for X-ray pictures for quite a spell in the vain hope that someone somewhere, somehow might perchance connect the landscape with the text, and certainly not the bewildered practitioner who remarked the other day that he never could tell an X-ray picture from a photostatic copy of the moon. Can you? The fault is not so much in the artistry as in the strange failure of authors to translate shadows and shadowy blends into words. Or, can that be done—like the microphotographers who do so well nowadays?"

Questions and Answers

"Questions and Answers" will be published on alternate weeks.

The submission of questions for inclusion in this column will be welcomed: they can relate to any aspect of veterinary work. For purposes of record, each question is numbered, and those submitting questions are required to furnish (not for publication) name and address.

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

Imperforate Anus

Q. CL.—*Imperforate anus is occasionally met with in the new-born foal, not uncommonly in the calf and lamb, and possibly in canines. Without successful surgical relief, the affected cannot survive.*

The literature on the subject in surgery text-books is scanty, unless it is to be found in later editions which have been brought up to date. If an operator unsuccessfully attempts to give relief, which, in the eyes of an owner may be deemed a simple looking operation, it is not helpful to one's reputation for the operation to end in failure, and especially if the subject belongs to pedigree stock, and considered likely one day to be of real value.

The questioner would like a reply on this operation from one who has had undoubted success in tackling it.

A.—The treatment of imperforate anus depends upon the anatomical conditions found at the time. These may be briefly classified as follows:—

(*a*) The rectum and anal canal are both present but the membrane between the two has not broken down.

(*b*) The rectum present but anal canal absent.

(*c*) Anal canal present but rectum may be poorly developed, even ending like a fibrous cord.

(*d*) Rectum and anus may both be absent.

(*e*) The rectum may open into some part of the urogenital system and the anus may or may not be developed.

It is only in (*a*) and (*b*) that one can attempt a useful operation.

In (*a*) all that is necessary is to incise the membrane, which bulges outwards, and then to dilate the hole, making a permanent passage. These cases generally do well if detected early.

In (*b*) an artificial anus can be made and then the rectum opened and its mucous membrane sutured to the edges of the artificial orifice. Occasionally these cases recover but there is likely to be trouble even if healing and free passage results, for, as a rule, the sphincter muscles of the anus are likewise ill-developed, if at all.

The writer has had several successful results in (*a*) but only one in (*b*) and that was in a yak—a relatively hardy animal.

The embryological factors involved should be explained to the owners and it should be pointed out that the operation is a delicate one and prognosis is always grave except in those cases when there is only a thin septum.

* * * * *

Outbreak of Coughing in a Dairy Herd

Q. CLI.—*What is the best way of dealing with an outbreak of coughing in a dairy herd?*

Recently I was called to a herd of about 25 cows, in which every animal was coughing to some extent; some were badly affected—off their food and reduced milk yield—but mostly it was just a persistent cough, with no other symptoms. In spite of the fact that the cows had been only on reseeded pasture and the young stock had never been affected, I diagnosed parasitic bronchitis and treated accordingly. Improvement was very slow. I seem to get an outbreak like this every year about November, in different herds.

A.—Persistent coughing in a dairy herd seems to be almost always fundamentally due to a parasitic infection; even though this may itself be cured, enough damage is done to lung tissue to set up a chronic bronchitis, or to provide a point of entry for secondary organisms, of which a Pasteurella seems to be the most frequent.

The first desideratum of treatment is to provide as liberal a diet as possible. War Agricultural Committees are usually prepared to consider sympathetically applications for extra rations when backed by a veterinary certificate as to their desirability. The present writer is old-fashioned enough to believe in the value of intra-tracheal injections in the treatment of husk. Treatment should be commenced with a massive dose of phenothiazine, *e.g.*, 80 to 100 gm., followed two days later by a four-day course of sulphapyridine, 2 oz. being given night and morning. (If the owner jibs at the expense of this drug, sulphanilamide is of some value.) Most cattle will take this mixed in a feed.

While the above method may be regarded as a counsel of perfection, excellent results may be obtained, occasionally even where the method outlined has failed, by the administration of small daily doses of linseed oil and turpentine.

Therapeutic Use of Electric Current

Q. CLII.—*What conditions in small animals might benefit from therapeutic use of electric current?*

What type of apparatus should be used and how should the current be applied?

A.—To give an adequate and worthwhile reply to this question would need the compilation of a small booklet. The enquirer would do well to consult one of the many text-books on medical electricity.

Briefly, however, the following outline may be of assistance:—

Ionization is a therapeutic method for which a galvanic current is employed, and in which one utilizes the ionic movement for the introduction into the body of the ions of certain drugs or chemicals. The result depends upon which salt has been chosen for use. Ionization has a marked value in the healing of stubborn ulcers, sinuses and indolent wounds, among several other conditions.

Faradism is the application of a low-voltage alternating current, used in cases of wasted muscles, completely paralysed placid muscles, stiff joints, etc., etc.

Galvanism.—The galvanic current is direct or uninterrupted. A modified galvanic current known as the surging or undulating current is much employed by medical men in the treatment of paralysis.

Diathermy is synonymous with "thermo-penetration." It is the application of currents of low tension and high amperage which produce warmth in the deeper parts of the body. Among the conditions for which it is useful are muscular rheumatism, arthritis, pelvic pains, sprains of ligaments, etc., painful malignant tumours, etc. Diathermy current can be used also as a haemostatic "cutting" current in surgical operations.

Infra-red rays were described in the issue of *The Veterinary Record*, January 26th (p. 40).

REPORT

[**City of Johannesburg.** Report of Director of Abattoir and Livestock Market Department, for the period July 1st, 1944, to June 30th, 1945.]

This annual report by Mr. A. C. Kirkpatrick follows the usual lines. The staff numbers 159 Europeans and 144 natives. Two members lost their lives on active service.

There passed through the open and quarantine markets 347,403 animals during the year under review, whilst 903,562 animals were slaughtered at the abattoir. The total amount of meat condemned was approximately 1,599 tons. It is surprising to read that only during 1944-45 were dial scales introduced into the abattoir for meat weighing. In view of the attempts made in this country to insure pigs, it is interesting to note that from April 1st, 1945, the insurance premium on pigs at Johannesburg was increased as follows:—

Pigs up to 100 lb. live weight from 1s. 6d. to 2s. per head.
Pigs over 100 lb. live weight from 2s. to 2s. 6d. per head.

As from July 1st, 1944, the Live Stock and Meat Industries Control Board levy 1s. per head on all pigs over two months old, and 3d. per head on pigs under two months of age.

There are 1,733 mules and horses, as well as 1,207 oxen in the service of the municipality, with an animal hospital and rest farm. The 1,919 Zoo exhibits are also inspected by the department, and 121 visits to dairies were made. In 9,052 cows inspected for tuberculosis of the udder and other diseases, four cases of open tuberculosis were found.

D. J. A.

U.S.A. VETERINARIAN AID FOR CHINA

"Dr. H. J. Stafseth, professor of pathogenic bacteriology, Michigan State College, has been granted a year leave of absence to head a delegation of veterinarians being sent to China by UNRRA and to act as veterinary adviser to the Chinese department of agriculture," observes *Veterinary Medicine* (Chicago) and continues: "The purpose is to develop in China a veterinary service similar to that in the United States. China has a population of 400,000,000, a large number of animals, a wholly inadequate number of veterinarians and an enormous amount of animal disease, including all the old major animal plagues—rinderpest, foot-and-mouth disease, contagious pleuropneumonia, piroplasmosis, bovine tuberculosis, surra, anthrax, glanders, hog-cholera, etc.

"The veterinary delegation will take with it all sorts of laboratory supplies, surgical instruments and other veterinary equipment. The headquarters of the mission will be at Nanking. A group of Chinese students are now taking a veterinary course at Michigan State College."

QUESTIONS IN PARLIAMENT

Disease-free Herds

Mr. A. HURD asked the Minister of Agriculture if he would consult with the Milk Marketing Board and the National Farmers' Union in order to evolve a systematic plan for building up disease-free dairy herds in advance of a further extension of the compulsory pasteurization of milk supplies.

Mr. T. WILLIAMS: I hope to be in a position fairly soon to discuss this matter with producer interests.

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COLONIAL DEVELOPMENT

Squadron-Leader DONNER asked the Secretary of State for the Colonies whether, in order to achieve more rapid economic development of total resources in the Colonies, he will ensure that in future the Colonial Research Committee undertakes the organizing and financing of scientific industrial surveys for the early utilization of data acquired either as a result of fundamental research and technological advance or from existing knowledge and practice.

Mr. CREECH JONES: The task of considering how best to use for the benefit of the Colonies both existing knowledge and new discoveries likely to assist economic development falls to a number of research and advisory bodies attached to the Colonial Office. There are, besides, research institutions and technical departments in the Colonies themselves. The Colonial Research Committee is concerned with the co-ordination of these various activities, with advising on the best distribution of the funds available for research, and with seeing that the whole ground is covered. The conception of the honourable and gallant Member is kept well in mind and in addition, Colonies are encouraged from time to time to make *ad hoc* surveys on particular subjects.

NOTES AND NEWS

Diary of Events

Mar. 27th.—Meeting of the Western Counties Division, N.V.M.A., at Exeter (University College), 2 p.m.
Mar. 29th.—Annual Meeting of the North of England Division, N.V.M.A., at Newcastle-on-Tyne (King's College), 2.15 p.m.
Mar. 29th and 30th.—Meeting of the Pathological Society of Great Britain and Ireland, at Sheffield University.
Apr. 1st.—R.C.V.S. Annual Fees due.
Apr. 4th.—Spring Quarterly Meeting of the Society of Dairy Technology (Welsh Section), at Llandrindod Wells (The Albert Hall), 11 a.m.
Apr. 8th.—Meeting of the Society of Veterinary Practitioners at St. Leonards-on-Sea (Warrior House Hotel), 2 p.m.
Apr. 10th.—R.C.V.S. Committee Meetings.
Apr. 11th.—R.C.V.S. Committee Meetings.
Apr. 12th.—R.C.V.S. Committee and Council Meetings.

N.V.M.A. Meetings at 36, Gordon Square:—

Apr. 15th.—Therapeutic Trials Committee at 11.30 a.m.
Finance and General Purposes Committee at 1.30 p.m.
Apr. 16th.—Sub-committee on First Aid Handbook at 10 a.m.
Organizing Committee at 12 noon.
Joint Veterinary Officers and Public Health and Parliamentary Committee at 2 p.m.
Appointments Committee at 4 p.m.

N.V.M.A. Meeting at the Connaught Rooms, Great Queen Street:—

Apr. 17th.—Council Meeting at 11 a.m.
Apr. 23rd.—Meeting of the Society of Chemical Industry (Agriculture Group), 2.30 p.m. (Venue to be announced later.)
Apr. 26th.—Meeting of the Mid-West Division, N.V.M.A., at Clifton (Bright's Café), 2.15 p.m.
May 3rd.—Meeting of the Welsh Branch, N.V.M.A., at Aberystwyth.
May 7th.—R.C.V.S. Animal Management Examinations, commencing in London.
May 7th.—R.C.V.S. Council Elections—Last date for Nominations.
May 21st.—R.C.V.S. Council Elections—Voting Papers issued.
May 28th.—R.C.V.S. Council Elections—Voting Papers to be returned.
June 4th.—R.C.V.S. Annual General Meeting.
June 4th.—R.C.V.S. Committee Meetings.
June 5th.—R.C.V.S. Committee Meetings.
June 6th.—R.C.V.S. Committee and Council Meetings.

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Notice to Correspondents

The Editorial Committee regrets that, the paper supply situation having deteriorated, it has become necessary to ask correspondents again to accept a limitation on the length of letters submitted for publication. Accordingly, contributors to our Correspondence Columns are requested to note that, until further intimation is made, their communications must not exceed 350 words.

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R.A.V.C. Takes Over Remount Department in India

Our readers will recall with what gratification the profession learned that, in accordance with a special Army Order of January 8th, 1941, the duties and functions of the Remount Service were to be amalgamated with the Army Veterinary Service and that in future they would be performed by the personnel of the Royal Army Veterinary Corps. This welcome absorption of the Remount Department by the Army Veterinary Service, however, applied to all theatres other than the Far East, and the relatively large Remount Service in India remained separate.

We now learn with great pleasure that the Director of Veterinary Services in India (Brigadier E. S. W. Peatt, O.B.E., F.R.C.V.S., was requested by the Quartermaster General, India, to take over the Remount Department in that country with effect from March 1st, 1946.

This further and important extension of R.A.V.C. activities is not only a striking tribute to the wisdom of the overdue step taken in 1941, but to the efficiency with which, under stress of war, the Corps has shouldered its wider responsibilities. We congratulate the Corps on this further recognition of its fine work, reflecting as it does the opinion of high military authorities that it has successfully performed, during the most exacting period of the war, the dual role in various theatres. In particular the provision of large numbers of animals, at short notice, for the Italian Campaign is outstanding in this respect.

* * * * *

Penicillin in Bovine Mastitis

We are informed that investigations made under the aegis of the Mastitis Conference of the Agricultural Research Council, by workers at six centres, have shown that a high percentage of *Str. agalactiae* infections can be sterilized with a minimal amount of udder disturbance by injection of penicillin solution *via* the teat canal.

The combined results of a recent trial in which all infected cows in a number of herds were treated are as follows:—

No. of Doses.	*Unitage.*	*Interval.*	*Infections Sterilized*	
			Cows.	*Quarters.*
1	100,000	—	31/62 (50%)	81/140 (57·9%)
2	20,000	24 hours	52/71 (73·2%)	123/154 (79·9%)
4	20,000	24 hours	47/65 (72·3%)	121/150 (80·7%)
4	10,000	Successive milkings.	53/73 (72·6%)	125/150 (83·3%)

It is concluded from these figures that one injection is insufficient (even though the dosage be 100,000 units), but that there is no significant difference between the other three methods, injection of 20,000 units on two occasions at daily intervals being, on practical grounds, the method of choice.

Work is being continued on *Str. agalactiae* and other mastitis infections.

* * * * *

Synthesis of Penicillin: Exchange of Information

The text has been published of an agreement reached by the Governments of Britain and the United States on the principles applying to the exchange of information relating to the synthesis of penicillin (Cmd. 6757, Stationery Office, 2d.).

The two Governments declare that they "are engaged in a common undertaking to secure as promptly as possible the production of an adequate supply of high quality synthetic penicillin or a therapeutic equivalent, at reasonable prices," and will, according to the agreement, exchange information "once each month and more often as the discovery of new information may warrant."

It is made clear that foreign patent rights will not be exercised to hinder export of synthetic penicillin to any foreign country. The agreement is deemed to have become effective on December 1st, 1943.

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THE LATE MR. ANDREW DONNELLY, M.R.C.V.S.

In the course of a tribute to the late Mr. A. A. Donnelly, of whom we published an appreciation in our issue of March 9th, the *Drogheda Independent* says that as Chief Veterinary Officer to Drogheda Corporation Mr. Donnelly shouldered heavy responsibilities with regard to the protection of the public concerning the consumption of meat and milk and could be described as a most conscientious and fairminded public official. "The news of his death," the notice concludes, "coming so unexpectedly, will be received with the deepest regret by a very wide circle of friends in Drogheda, and an exceedingly wide clientele in Louth, Meath and North Co. Dublin."

The Funeral

Solemn Requiem Mass was offered up in St. Peter's Church, Drogheda, on March 2nd, the celebrant being the Rt. Rev. Mgr. Quinn, D.D., P.P., St. Peter's. The funeral to St. Peter's cemetery was exceptionally large and was very representative of agricultural circles in Louth and Meath; also of all classes in Drogheda. The Rev. P. McDonnell, C.C., officiated.

The chief mourners included Mrs. Donnelly (widow); Messrs. Alan Donnelly, solr. (Navan), Arthur Donnelly, M.R.C.V.S., Shane Donnelly, Jim Donnelly, M.R.C.V.S., and Pat Donnelly (sons); Misses Mary and Dagmar Donnelly and Mrs. Joseph Hardy (daughters), Mrs. Michael Deeny, Lurgan, Misses May and Emma Donnelly, Lurgan (sisters), and Mr. Leo. Donnelly, Lurgan (brother).

Veterinary surgeons were present from all over Meath, Louth and Dublin, as well as the following: Professor W. Kearney (President, Veterinary Council, Ireland); Mr. John A. Flynn (President, Veterinary Medical Association of Ireland); Mr. John F. Timoney (Vice-President, do.); Professor T. G. Browne (Principal, Veterinary College, Dublin); Mr. Patk. Harnett (Superintendent, Veterinary Officer, Dept. L.G. and P.H.), and Mr. Thos. A. Finch (representing Veterinary Medical Association of Northern Ireland).

Corporation's Tribute

At the meeting of Drogheda Corporation, the Mayor (Councillor F. Dennis) said that since their last meeting one of their most efficient officers, Mr. Andrew A. Donnelly, M.R.C.V.S., had passed away. Mr. Donnelly, he said, had spent a long and honourable career in the service of the Council and carried out his duties in a most painstaking manner. It would be hard to fill his place.

Councillor J. Dowd seconded the expression of sympathy with the family and relatives of the deceased.

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PERSONAL

Births.—Foulston.—On March 17th, 1946, at the Minehead and West Somerset Hospital, to Toni (*née* Yeomans), wife of F/Lt. W. Foulston, M.R.C.V.S.—a daughter.

Jones.—On March 3rd, 1946, at The Mary Stanley Home, Bridgwater, to Ruth, wife of D. K. Jones, B.V.Sc., M.R.C.V.S., Glastonbury, Somerset—a son, Richard Anthony.

Macrae.—On March 2nd, 1946, at Edenfield House, Doncaster, to Joan (*née* Beetham), wife of Lt.-Col. R. I. Macrae, R.A.V.C.—a daughter.

* * * * *

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Foot-and-Mouth Disease:

Hants.—Portdown Farm, Leith Avenue, Portchester, Portsmouth, Southants. (Mar 18th).

Surrey.—Park Farm, Cobbett Farm, Normandy, Guildford (Mar. 15th).

Swine Fever:

Hants.—"Little Firs," Lopscombe Corner, Nether Wallop, Stockbridge, Southants. (Mar. 18th).

Hunts.—400, Farm, Benwick, March, Cambs. (Mar. 12th).

Essex.—15, Court End, Foulness Island, Southend-on-Sea, Essex (Mar. 16th).

Lincs. (Holland).—Gedney, Holbeach, Lincs. (Mar. 15th).

Lincs. (Kesteven).—"Horse and Groom," West Street, Bourne, Lincs. (Mar. 15th); South Kyme, Lincoln, Lincs. (Mar. 18th).

Lincs. (Lindsey).—Richmond Drive, Skegness, Lincs. (Mar. 16th).

Ross and Cromarty.—19, North Street, Sandwick, Stornoway, Isle of Lewis (Mar. 15th).

Yorks. (*E.R.*).—Old Mill, Dansome Lane, Hull (Mar. 16th).

Sheep Scab:

Yorks. (*W.R.*).—Dove Cote Farm, North Deighton, Wetherby, Yorks. (Mar. 8th).

Westmorland.—Gill Head, Helton and Hullock Howe, Bampton, Penrith, Cumberland (Mar. 9th).

Worcs.—53, Sillons Avenue, Redditch, Worcs. (Mar. 18th).

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"LIVESTOCK THE BASIS OF OUR FUTURE AGRICULTURAL ECONOMY"

In the course of his address to farmers at Carlisle on Saturday last, Mr. Tom Williams, the Minister of Agriculture, said that the Government had not forgotten the livestock farmer in its more immediate pursuit of more cereals and potatoes. "We recognize that livestock and especially milk will form the basis of our future agricultural economy, and that after this temporary setback we must plan for a revival in livestock numbers. The new prices take account of the disturbance to livestock production and you will notice that significant increases of price have been settled for the forthcoming production year which will, I am confident, encourage livestock producers to make every effort to overcome the shortage of rationed feeding-stuffs and maintain their flocks and herds at a high level. . . .

"The long-term guarantees provided by the Government are of particular importance to livestock producers. They can now plan ahead to 1950 with full confidence and I hope that, with the price guarantees at their back, they will put every ounce of energy into their efforts to raise the standard of productivity of our livestock. Never before has the need for action been so urgent. Cumberland, like the rest of the North, is proud of its livestock but there is still room for improvement in production standards. Pure breeding from good strains of uniform type is the best and only sure way. There are three lines of attack, all of which must be pursued if lasting results are to be achieved. First, cull bad doers. Secondly, record performance as a guide to economic feeding and the selection of good yielders. I am sure it will pay you well in Cumberland to make much more use of milk recording. Finally, see that you use a succession of good sires of the same breed and type."

Hill Sheep Farming

On the Government's policy for hill farming, the Minister said that the subsidy paid since 1940 had done little more than keep the industry's head above water, and help to preserve the foundation flocks of hardy sheep which we must maintain if the sheep population of the country is ultimately to be restored.

"After considering the reports prepared by the Committees which examined this problem in England and Scotland under Earl De La Warr and Lord Balfour of Burleigh, the Government has decided to accept their principal recommendations with certain modifications. The Government's policy is embodied in the Bill which has now been presented to Parliament. Its main object is to help with reconditioning the hill farms so that their occupiers will once more be able to stand on their own feet and make a worthy contribution to the nation's food supply. Owing to the depression in the industry a good deal of farm equipment, buildings and fences have fallen into disrepair or have not been kept up to modern standards. The hill grazings themselves have in many cases deteriorated and need regeneration, while there is urgent need for the provision and extension of intakes to provide hay and wintering for stock. Many farms also lie in remote districts, are extremely difficult of access, and lack modern amenities such as good access roads, piped water supply, etc., with the result that shepherds, and indeed tenants, are hard to replace when their places become vacant. These are some of the conditions which we intend to remedy if Parliament passes the Bill. Under it landlords and tenants will be able to submit schemes for improving their farms and, if these are approved, the Government will contribute half of the cost of the work. As it will be several years before farmers can hope to reap full benefit from many of the improvements, we propose to continue the existing subsidies for hill sheep and cattle for a further five years, should that prove necessary. The actual rates will be announced each year as is done at present. The Bill also provides for other matters of importance to the industry, such as the regulation of heather burning and the control of hill rams.

"The Bill is in many respects an experimental measure. The funds available for grants are limited to £5,000,000 and the initiative in putting forward schemes will rest in your hands. I hope you will show the nation what you can do to help yourselves with the aid of a certain amount of help from the State. Your industry must be restored to its full food-producing capacity. The Government is determined to see a prosperous agriculture in this country and you hill farmers have a vital part to play in the restoration of British livestock production. Let us all go forward together and win for agriculture its rightful place in the eyes of the nation and of the world. We all have a job to do in that great task."

INTERNATIONAL MEDICAL BODY

Medical experts of 17 of the United Nations met in Paris on March 18th to discuss the formation of an international medical body that would unite the International Health Office, the Health Section of the League, and that of U.N.R.R.A. "Several weeks of discussion are expected," adds the Paris Correspondent of *The Times*.

* * * * *

A PHOTOSENSITIZED KERATITIS IN CATTLE DOSED WITH PHENOTHIAZINE

L. K. Whitten, N. T. Clare and D. B. Filmer, of the Wallaceville Animal Research Station, Wellington, New Zealand, write as follows in the issue of *Nature* of February 23rd, 1946:—

Since the discovery of the anthelmintic properties of phenothiazine, it has been used widely in New Zealand for the treatment of young sheep and cattle.

During the past year there has been brought to our notice, by field veterinarians and inspectors of stock, the occurrence of a number of cases of corneal opacity and temporary blindness in calves a few days after ordinary therapeutic doses of phenothiazine. We have definite records of its occurrence on 25 farms; only one or two animals may react, but in one instance every calf in a mob of 17 was affected. The symptoms observed the day after dosing were profuse lachrymation and sometimes a slight oedematous swelling of the skin around the eye and including the upper eyelid. Between 36 and 60 hours after dosing there appeared, in one or both eyes, a diffuse opacity the position of which was characteristically between the centre of the cornea and its lateral border. There was little loss of appetite, and photophobia, though present, was not very marked. In some animals the lesions disappeared within ten days, but in more severely affected cases a marked oedema of the epithelium and substantia propria developed and ulceration occurred about the fourth or fifth day. Some of these animals still exhibited a slowly resolving lesion after three or four months. Similar ocular lesions have been referred to in accounts of phenothiazine poisoning in pigs[1,2], but there is no record of its occurrence in cattle or other animals.

Experiments to study the condition are in progress at Wallaceville, using young calves as experimental animals. Lesions have been produced in calves dosed with several samples of the drug, with and without added wetting and suspending agents, and of British, American and Australian manufacture. A recrystallized sample gave similar results.

Evidence obtained from field cases and from controlled experiments shows clearly that bright sunlight is necessary for the development of the lesions, although marked signs of photosensitization of the skin are not present. Lesions fail to develop in dull weather or in stalled animals. When one eye is covered by a black velvet shield, lesions do not occur in that eye. Furthermore, the characteristic position of the lesion is on that portion of the cornea which is most exposed to light during grazing. When animals are restrained in a lateral recumbent position, the lesion develops above the centre of the cornea, again the area receiving most sunlight.

Photosensitization by phenothiazine derivatives has been studied in man[3] and in pigs[4], but there is no record of its occurrence in sheep, and negative experimental results were obtained by Swales.[5]

Corneal lesions are not a recognized feature of photosensitivity diseases. However, we have produced typical corneal lesions in calves by injecting haemotoporphyrin into the anterior chamber and afterwards exposing the eyes to sunlight, and similar results were obtained by the injection of phenothiazine derivatives (thionol, phenothiazone, and the leuco phenothiazone conjugate isolated from sheep urine). Derivatives of phenothiazine, not yet definitely identified, have been detected in the aqueous humour and tears of dosed animals, but concentrations were considerably lower than contemporary blood levels.

Corneal opacities and also photosenitization of the shaved skin have been produced in a light-coloured calf dosed with phenothiazine and afterwards exposed to radiation from an impregnated carbon arc lamp passing through window glass and a Wood's glass filter. From these results it appears likely that the effective radiation lies between 320 and 380 $m\mu$.

A fuller account of the observations recorded above is to be published elsewhere, and further attempts are being made to identify the particular substance responsible.

(1) Thorning, W. M., Morrill, C. C., and Boley, L. E. (1942.) *Vet. Med.* 37. 120.
(2) Britton, J. W. (1943.) *Cornell Vet.* 33. 368.
(3) De Eds, F., Wilson, R. H., and Thomas, J. O. (1940.) *J. Amer. Med. Assoc.* 114. 2095.
(4) Swales, W. E., Albright, W. D., Frazer, L., and Muir, G. W. (1942.) *Can. J.* 6. 169.
(5) Swales, W. E. (1940.) *Can. J. Comp. Med.* 4. 164.

VICTORIA VETERINARY BENEVOLENT FUND

IN MEMORY OF DR. FRED BULLOCK

Second List

Donations gratefully received from:—

Mr. H. W. Dawes, Major W. H. Kirk, Lancashire Veterinary Society, Capt. S. J. Motton, R.V.C. Students (Camden Town), Mr. A. Sams.

Amounting to	£22	6	0
Previous List	69	18	6
Total to date	£92	4	6

March 18th, 1946.

* * * * *

AGRICULTURAL RESEARCH IN EAST AFRICA

"One of the principal tasks of the three representatives of the Agricultural Research Committee now in East Africa will be to consider the reorganization of regional Agricultural Research there," states the Colonial Office News Service, and continues: "The representatives, who are to tour Kenya, Tanganyika, Uganda and Zanzibar, Nyasaland and, possibly, Northern Rhodesia, are Sir Harold Tempany, Agricultural Adviser to the Secretary of State for the Colonies, Sir Frank Engledow, Drapers' Professor of Agriculture at Cambridge University, and Professor F. Munro, Professor of Entomology and Zoology at the Imperial College of Science, London. The three are recognized world authorities on agriculture. Professor Munro, who will pay special attention to questions relating to insect pests and crops, has, since last year, been engaged on special research work on pyrethrum as the result of an arrangement made with the Pyrethrum Growers' Association. Sir Harold Tempany, before his present appointment, has been Director of Agriculture in Malaya, Mauritius and the Leeward Islands."

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INTER-VETERINARY COLLEGE RUGBY FOOTBALL

VETERINARY COLLEGE OF IRELAND 3. ROYAL VETERINARY COLLEGE (LONDON) 0

After a lapse of six years the Royal Veterinary College travelled to Ireland on March 8th to play for the Wooldridge Cup—continuing the series started in 1909.

This temporary departure from the austerity of England to the comparative plenty of Ireland—coupled with the warm hospitality of the Irish—made the visit one which the English team will long remember.

The game was under the direction of Irish International referee Mr. N. H. Lambert, M.R.C.V.S., and was attended by a large number of Irish students with members of the Dublin College staff. Play was brisk and mostly confined to the forwards. The London pack gained possession in the tight but were steadily beaten in the loose by a Dublin pack which indulged in a chiefly spoiling game. Despite several penalties, at least one in an easy position, London failed to score and late in the first half the Dublin forwards broke through from their own "25" for the only try of the match. Fannin touched down but O'Rourke failed to convert. The second half was mainly one of forward rushes with Lewis and Hammond prominent for London. Notwithstanding several good runs by Ryan, the Dublin captain, the score at the final whistle was still 3—0.

Everyone present at the dinner after the match cordially endorsed Professor T. G. Browne's sentiment that the restarting of these games is bound to strengthen the links between the profession and between its students in both countries. Regret was expressed by both sides that Professor Wooldridge was unable to travel with the London team.

The teams were:—

Dublin.—F. Corcoran; K. Maher, E. O'Byrne, P. Ryan (Capt.), K. McCarthy; J. O'Rourke, B. McClancy; H. Pentland, R. Lynch, M. Murphy, P. Casserley, D. Donovan, M. Geraghty, P. Moorehead, J. Fannin.

London.—P. L. Stafford; R. A. James, A. Harries, H. E. Roberts, B. Taylor; W. Hopkins, H. B. Darbishire; F. Brown, T. R. B. Lewis, T. Pay, F. C. Hammond, E. A. Wells, G. Gilbert, S. M. C. Jones (Capt.), A. Hodgson.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

* * * * *

VETERINARY EDUCATION

Sir,—On December 15th last you published a report of the Council of the University of Wales on proposals for the establishment of a school of veterinary science within the university, and you also published portions of a reply to the report made by myself in the *Western Mail*.

Inasmuch as I write as Chairman of the organization established by the county councils and county boroughs of Wales, which is charged with the duty of securing for Wales a new institution that would provide in Wales complete training for qualification as veterinary surgeons, it was unfortunate that some portions of my communication to the Press were omitted from *The Veterinary Record*.

The deleted paragraphs were:—

"It has been always urged that the veterinary profession should be recruited as far as possible from the country areas: preferably from among the sons and daughters of farmers and veterinary surgeons. According to the report of the Welsh University Council these students should be made to spend most of their professional life in a country area in order to ensure that they become 'animal minded.' While urging this, on the one hand, the Council emphasizes the advantages of university education on the other. This is surely contradictory in its reasoning. It would, furthermore, be unjust and unwise to keep all our students in a rural area and deny them the full advantages of university life and associations for the sake of the few who are not 'animal minded.' If this small minority cannot become 'animal minded' during the 20 weeks vacation in each year they would be well advised to change their vocation.

"Our qualified veterinary surgeon has no superior in any other country; his certificate is accepted the world over, and he is the product of our own present day system."

It will be seen that my main thesis was:—

1. That to urge the profession at one time to recruit its ranks from the countryside and at the same time to send those recruits back into the country during the academic terms to become "animal minded," is not to give them university education as it is generally understood, but to deny them its main benefits.

2. A claim that the general veterinary practitioner in this country is unsurpassed in any other.

Anyone acquainted with the history of veterinary education knows that the profession has been reproached for its supposed isolation. Nothing could be more illogical than the present proposals for segregation which are being advanced in certain quarters.

Yours faithfully,

Pentrebychan Hall, Wrexham. JOHN SHARE JONES.

March 12th, 1946.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Parasitic Mange*	Sheep Scab	Swine Fever
Feb. 16th to 28th, 1946 ...	3	—	—	8	22
Corresponding period in—					
1945 ...	4	12	1	5	28
1944 ...	7	—	—	6	18
1943 ...	12	1	—	13	23
Total Jan. 1st to Feb. 28th, 1946 ...	21	17	4	24	112
Corresponding period in—					
1945 ...	22	37	2	16	173
1944 ...	46	3	3	46	97
1943 ...	58	9	2	64	86

NOTE.—The figures for the current year are approximate only.
* Excluding outbreaks in Army Horses.

Tuberculosis (Attested Herds) Schemes

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at February 28th, 1946, was as follows:—

ENGLAND	WALES	SCOTLAND	TOTAL (GREAT BRITAIN)
5,506	9,399	5,809	20,714

* * * * *

Erratum.—We regret that the surname of Mr. Samuel Laxton Hames, of Oakham, Rutland, was erroneously reproduced by the printers as Hawes, in our reference to him last week as heading the list of *Chirurgorum Veterinariorum Collegii Regii Seniores*.